



GREEN SOLUTIONS

ENVIRONMENTAL CONSULTING

FINAL
TEST RESULTS

FOR THE

CLARK COUNTY RECYCLING
CHARACTERIZATION STUDY

OCTOBER 2015

RECYCLING CHARACTERIZATION STUDY

FINAL TEST RESULTS

INTRODUCTION

This report provides the results of composition tests that were conducted on curbside recyclables collected from single-family homes in Clark County. This work was performed by Green Solutions and a team of volunteers on April 4, June 13 and October 17, 2015.

These tests were part of a “before-and-after” test that was designed to measure the impact of an outreach campaign that was conducted in April and May, 2015. The results of these tests show the level of contamination prior to the outreach campaign (April) and the level of contamination after the completion of the campaign (June and October).

CONCLUSION

The results of the composition tests show that there was a reduction in the contamination levels of the curbside materials. The total amount of contamination (“unacceptable materials”) dropped from 26.4% in the first test to 20.5% in the second test and 19.6% in the third test. Unacceptable materials include non-recyclable types of paper and plastic, glass bottles, plastic film and bags, and other contaminants.

APPROACH

The recyclable materials used for these tests were collected by Waste Connections in the week before each test. Waste Connections sampled three routes per day, Monday through Friday, and placed this material in a roll-off container (this was the “initial sample”). The target amount taken from each load was 250 pounds. On the day of the test, this roll-off was emptied onto the tipping floor at West Van and samples were taken from it (see Photo 1).

Photo 1: Taking Sample of Curbside Materials



Photo taken October 17, 2015. Photo shows recyclable materials being sampled from the middle of the pile.

Sampling and testing of the recyclable materials was conducted by a team of volunteers (see Photo 2) under the direction of Rick Hlavka (Green Solutions). The volunteers were organized by the Clark County Department of Environmental Services and included a mix of Clark County staff, City of Vancouver staff, Waste Connection staff and Master Recyclers. Many of the same people participated in all three tests, thus providing a good level of consistency in the procedures used.

Rick Hlavka arrived at West Van at 7:00 a.m. on the day of each test to set up the sorting equipment and make other preparations. Waste Connections staff met him there and assisted by emptying the roll-off containers and providing a secure working area. The volunteers arrived at 8:00 a.m. and were provided first with health and safety instructions, followed by a description of the sorting procedures to be used.

Photo 2: Volunteer Crew Sorting Recyclables



Photo taken October 17, 2015. Photo shows crew of volunteers sorting recyclable materials at West Van.

The sorting table, scales and other equipment were set up near the pile of initial sample. Since the amount of initial sample was too large to manually sort in one day, only a portion of this pile was taken for sorting purposes. The goal for each day was to sort 1,000 pounds of material, and the actual weight sorted for each of the three tests was:

April 4 – 1,053 pounds

June 13 – 1,038 pounds

October 17 – 1,287 pounds

For each test, the pile of initial sample was sampled in two places: in the middle of the pile and on one end. Material was removed from these two locations so that all of the materials from top to bottom were included in the sampled material. The sample from the end also gathered all of the materials from side to side. The sample in the middle of the pile was in the form of a slice of material that included all materials from top to bottom and to the center of the pile.

The composition tests of the recyclables were conducted using typical sorting methods. Recyclable materials were brought onto a sorting table one can at a time (32-gallon wheeled garbage cans were used for this). The volunteers, who were positioned around the table, then removed specific materials and placed those into separate containers around the table according to the list of categories developed for this test (see Attachment A). The containers used for this were 32-gallon trash cans and 5-gallon buckets. A 2-inch screen in the bottom of the sorting table facilitated the removal of “fines” (materials less than two inches in size). As the containers around the table filled up, they were removed, weighed, emptied and returned to the table. At the end of the day, all containers were removed and weighed. The weight data was recorded on a sample data form designed for this project (see Attachment B). After weighing, the sorted recyclable materials were placed in a separate pile near the initial sample, and at the end of the day all of these materials and the remaining (unsorted) recyclable materials were pushed into the receiving area for recyclables at West Van. Contaminants sorted from the recyclables were dumped onto the nearby tipping floor for self-haul garbage customers.

The weights recorded on the sample data form were later entered into a spreadsheet and the percentages for each category were calculated.

RESULTS AND OBSERVATIONS

The results from the materials sorted on each day are shown in Table 1. The categories not shown in the table were not found in any of the three tests, including partially-full aerosol cans, antifreeze and medications. Some observations of the materials found are described below.

Paper: The contaminated cardboard found was primarily pizza boxes stained with grease or with food (cheese) adhering to them. A fairly strict standard was used for this category, and many of the items included in this category had only small grease stains and were probably acceptable to most paper mills. A strict standard was also applied to other non-recyclable types of paper, and most of the items included in the non-recyclable paper category were beverage cartons and frozen food packaging that may have been at least partially recoverable at paper mills.

It’s interesting to note that the results for cardboard and newspaper were quite different in the first test (April) versus the second and third tests (June and October), but the overall amount of recyclable paper was similar in all three tests. The amount of non-recyclable paper dropped significantly from April to October, despite the potential for this category to increase in June due to seasonal increases in beverage consumption.

Plastics: The increase in plastic bottles from the April to June tests and the subsequent decrease in October seems likely due to seasonal increase in beverage consumption, although this category also contains some types of bottles that probably do not exhibit seasonality (such as milk jugs). The increase in plastic nursery pots from April to June and the decrease in October makes sense based on expected consumption patterns (i.e., more pots generated in June due to spring and early summer gardening activities). The results for tubs increased steadily over the three tests, possibly indicating increasing awareness and acceptance of tubs as a recyclable material, although this is not a sufficient amount of data to allow a firm conclusion for that. Not much can be said about the few plastic buckets found (one in the April and October, three in June).

Table 1. Sample Results for All Tests			
	April 4	June 13	October 17
Acceptable Recyclable Materials			
Paper	60.7	61.4	62.5
Cardboard	27.6	17.9	17.1
Newspaper	7.0	14.7	12.6
Mixed Paper	24.7	27.5	31.6
Milk Cartons, Drink Boxes	0.9	0.8	0.7
Shredded Paper, Bagged	0.5	0.4	0.5
Plastic	8.0	11.3	7.4
Plastic Bottles	7.4	9.9	6.4
Plastic Tubs	0.4	0.9	1.0
Nursery Pots	0.1	0.4	0.04
Buckets	0.2	0.1	0.04
Metals	4.9	6.8	10.5
Aluminum Cans	2.0	2.4	1.8
Aluminum Foil and Pans	0.02	0.1	0.1
Tin Cans	1.8	2.7	3.0
Scrap Metal	0.8	1.3	5.5
Aerosol Cans, Empty	0.2	0.3	0.1
Subtotal, Acceptable Materials	73.6	79.5	80.4
Unacceptable Materials			
Paper	7.3	5.5	4.1
Cardboard, Contaminated	1.2	1.1	0.5
Shredded Paper, Unbagged	0.05	0.04	0.2
Non-Recyclable Paper	6.1	4.4	3.3
Plastic	4.0	3.3	2.8
Plastic Bags, Bagged	0.4	0.03	0.0
Plastic Bags, Loose Grocery	0.2	0.05	0.1
Plastic Bags, Loose Other, Recyclable	0.2	0.2	0.1
Plastic Bags, Loose Other, Non-Recy.	0.1	0.1	0.2
Plastic Film and Wrap	0.4	0.4	0.4
Plastic Clamshells and Lids	0.7	0.7	0.4
Plastic, Other Packaging	1.9	1.7	1.5
Plastic, Styrofoam	0.1	0.1	0.1
Glass	2.0	3.2	1.3
Glass Bottles	1.9	3.1	1.2
Non-recyclable Glass	0.1	0.05	0.01
Other	13.2	8.5	11.5
Textiles	1.4	0.4	0.4
Bagged Batteries	0.0	0.0	0.1
Loose Batteries	0.0	0.01	0.0
Medical Waste, Sharps	0.0	0.01	0.0
E-Waste	0.1	0.0	0.5
Wood	0.1	0.4	0.4
Garbage, Bagged	3.5	2.7	0.7
Miscellaneous	5.7	2.5	3.8
Fines	2.4	2.5	5.7
Subtotal, Unacceptable Materials	26.4	20.5	19.6
Total	100.0	100.0	100.0

All figures are percent by weight.

The overall amounts of plastic bags and film decreased from 1.2% in April to 0.7% in June, and then rebounded slightly to 0.8% in October. Specific materials within this group show a variety of patterns but in general the different types of plastic bags have dropped since the promotional campaign was conducted after the April test. The category for non-bag plastic film (plastic film and wrap) has stayed the same throughout all three tests, although a reduction would have been measured in the October test if it had not been for a single large piece of plastic film that was found in the sample.

Metals: The slight increase in aluminum cans from the April to June results and subsequent decrease in October could reflect seasonal fluctuations in beverage consumption (in other words, more beverages were consumed in June due to the hotter weather that month). The amount of scrap metal found increased somewhat from 0.8% in April to 1.3% in June, and then increased substantially to 5.5% in October. The increase in October was due to several pieces of metal that were found in the sample, so it seems unlikely that this was a random result (since the increase was not due to a single piece of metal) but it is unknown why participants might be placing more metal in their recycling carts now.

Glass: The amount of glass bottles increased from the April to June results and then decreased in October. The increase in June could reflect a seasonal increase in beverage consumption. Although the amount of glass decreased in October, the amount of fines increased significantly in October and much of that material was broken glass. Hence, the apparent decrease in October could have simply been the result of more of the glass being broken.

Other: A surprising amount of clothing was found in the recyclable materials in April, but less was found in June and October. There were also fewer bags of garbage found in June and even fewer found in October. Bagged materials found during sorting were examined closely to determine whether the bags should be classified as “bagged garbage” (in which case the entire bag was placed in that category) or if the bag was a bag of recyclables (if the bag contained 90% or more recyclables, then the bag was emptied and the contents were sorted into the appropriate categories).

In June, the only item found in the “loose batteries” category was a single AA battery, and in October a single bag of batteries was found. For the “sharps” category, two syringes were found in June. The “e-waste” found in April and October were not actually electronics included in Washington State’s e-waste program, but included two cell phones in April and a DVD player in October. The “motor oil” found in October was actually a single oil filter and the “non-recyclable glass” found that month was a single CFL bulb. No antifreeze or other medical wastes were found in any of the three tests.

RECOMMENDED NEXT STEPS

It appears that the outreach campaign had a positive impact on the quality of recyclables set out in Clark County and could be considered as potential method to be used in the future.

ATTACHMENT A
List of Material Types for Characterization Study Sort

ACCEPTABLE	Aerosol Cans - Empty
	Cardboard
	Metal – Aluminum cans (including aluminum cat food cans)
	Metal – Aluminum pie plates and foil
	Metal - Other - Less Than 35 Pounds and no larger than 24 Inches in any dimension;
	Metal – Tin Cans
	Paper - Milk Cartons, Drink Boxes, Soy Milk and Soup Boxes
	Paper - Mixed - Magazines, Junk Mail, Phone Books, Paper Bags, Cereal Boxes, Gift and Shoe Boxes, Writing and Printing Paper
	Paper – Newspaper
	Paper - Shredded - contained in brown paper bag
	Plastic – Bottles
	Plastic - Nursery pots
	Plastic - Buckets - 5-gallon or less
	Plastic –Tubs (6 oz. or more, smaller tubs included with “other plastic”)
UNACCEPTABLE	Aerosol Cans - Not Empty
	Antifreeze
	Batteries – Bagged
	Batteries – Loose
	Block Foam – Including “peanuts” if recoverable
	Cardboard – Contaminated
	E-waste
	Garbage – Bagged
	Glass – Recyclable (bottles and jars)
	Glass - Not recyclable
	Medical Waste – Medications
	Medical Waste – Sharps
	Misc. - Everything else, including non-recyclable metals, food and plastic objects
	Motor Oil
	Paper - Not Recyclable (including 12-pack cartons)
	Paper – Shredded, not contained
	Plastic - Bags – bagged
	Plastic - Bags – loose (grocery)
	Plastic - Bags – loose (other than grocery, separate into recyclable and non-recyclable grades)
	Plastic - Clam Shells and lids
	Plastic - Film/Wrap
	Plastic – Other packaging (blister packs, other packaging)
	Textiles – Clothing
	Too Small – (e.g., metal or plastic lids) Under 2 inches
Wood	

**ATTACHMENT B
SAMPLE DATA FORM
CLARK COUNTY RECYCLING CHARACTERIZATION STUDY**

Sample #: _____	Date: _____ Time: _____	
MATERIAL	WEIGHTS	COMMENTS
Cardboard		
Cardboard, contaminated		
Newspaper		
Mixed Waste Paper		
Milk Cartons, Drink Boxes		
Shredded Paper, Bagged		
Shredded Paper, Unbagged		
Non-Recyclable Paper		
Plastic Bottles		
Plastic Tubs		
Nursery Pots		
Buckets		
Plastic Bags, bagged		
Plastic Bags, loose grocery		
Plastic Bags, loose other		
Plastic Film/Wrap		
Plastic Clamshells and Lids		
Plastic, Other Packaging		
Plastic, Styrofoam		
Aluminum Cans		
Aluminum Foil and Plates		
Tin Cans		
Scrap Metal		
Aerosol Cans		
Aerosol Cans, not empty		
Glass Bottles (recyclable)		
Glass, not recyclable		
Batteries, bagged		
Batteries, loose		
Antifreeze		
Motor Oil		
Medical Waste, medications		
Medical Waste, sharps		
Textiles		
E-Waste		
Wood		
Garbage, bagged		
Miscellaneous		
Fines		